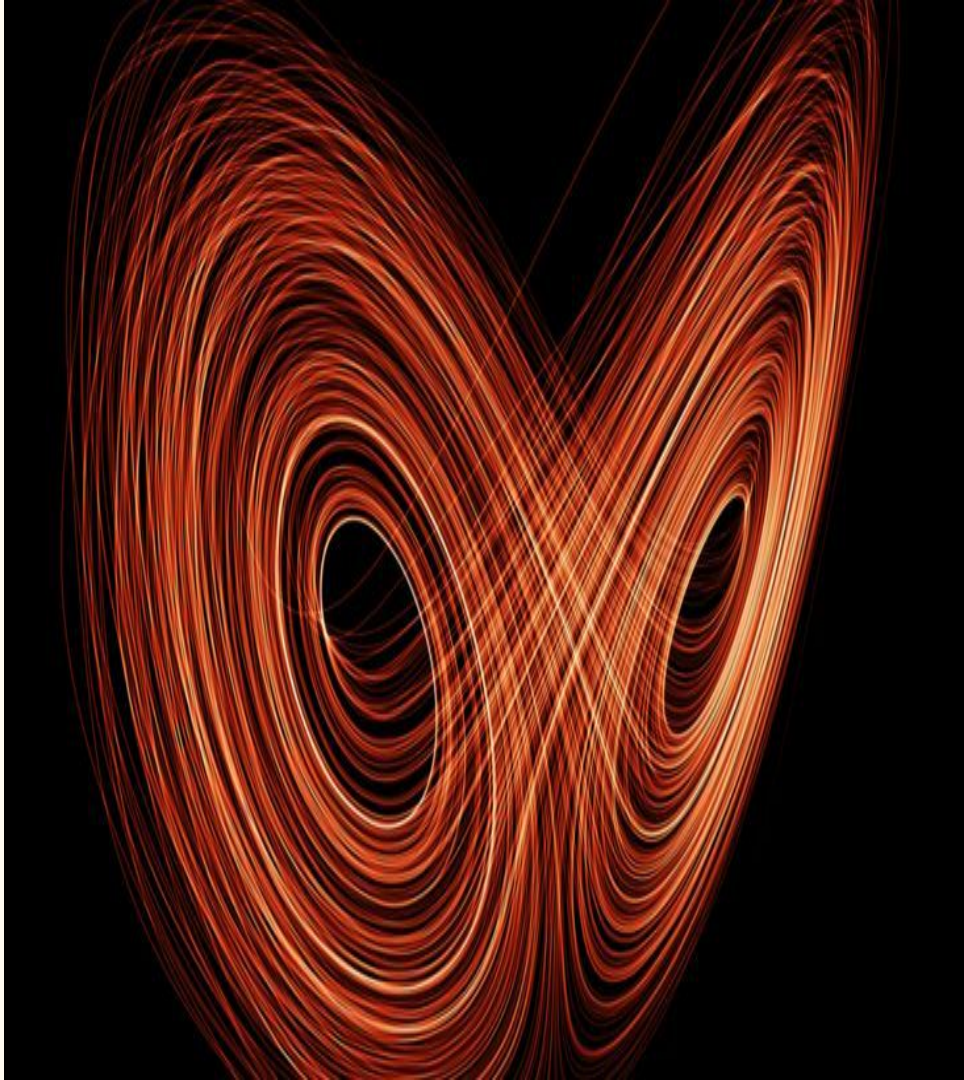
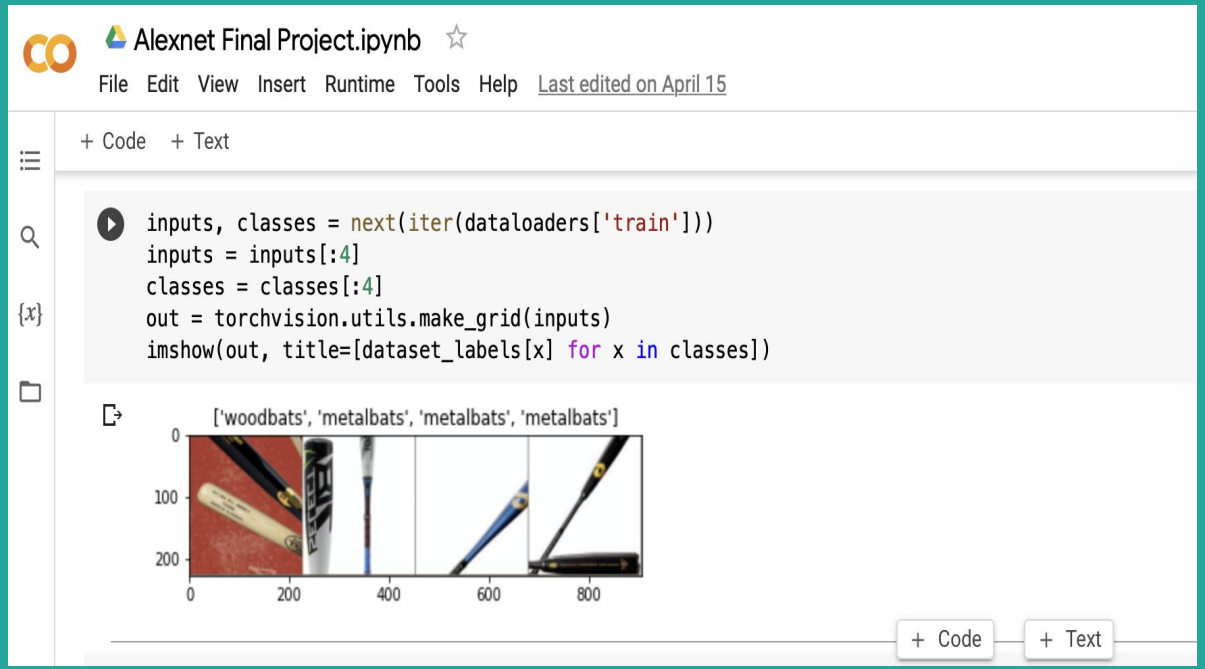
Engineering Mathematics

By Xavier Carbia



Projects



- One of the projects I did was doing an Alexnet of Google Collaborate between two objects, metal baseball bats and wooden baseball bats.
- Learning how to use code was crucial.
- The possibilities are endless with having this Artificial Intelligence learn how to identify certain objects.


SPALDING
SOFT BALL
HIGHEST QUALITY
SPALDING
1823
REG. U.S. PAT. OFF.
COLLEGIATE
HILLERICH & BRADSBY CO.
MADE IN U.S.A.
H&B
No. 60
LOUISVILLE, KY.
OFFICIAL
Mickey Mantle
MODEL
250
HILLERICH & BRADSBY Co
MADE IN U.S.A.
KENTUCKY
Seasoned

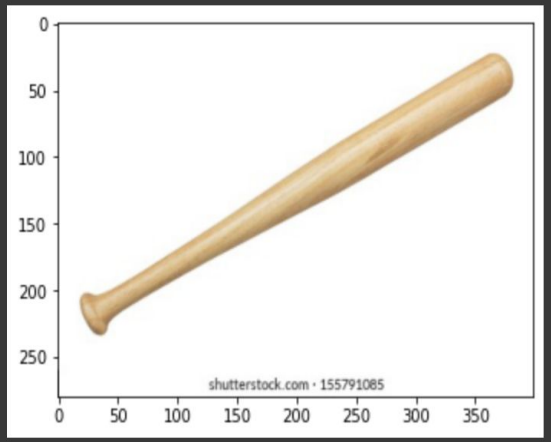
VS.


EASTON
EASTON
EASTON
EASTON
EASTON
SC500
C500
Z-CORE

FINAL TEST IN THE ALEXNET

Test

```
[ ]  image = io.imread('https://image.shutterstock.com/image-photo/wooden-baseball-bat-
     plt.imshow(image);
```



Optimal Stroke Learning with Policy Gradient Approach for Robotic Table Tennis

Yapeng Gao[1*], Jonas Tebbe[1] and Andreas Zell[1]

[1*]Cognitive Systems, Eberhard Karls University Tübingen, Geschwister-Scholl-Platz, Tübingen, 72074, Baden-Württemberg, Germany.

*Corresponding author(s). E-mail(s):
yapeng.gao@uni-tuebingen.de;
Contributing authors: jonas.tebbe@uni-tuebingen.de;
andreas.zell@uni-tuebingen.de;

Abstract

Learning to play table tennis is a challenging task for robots, as a wide variety of strokes required. Recent advances have shown that deep Reinforcement Learning (RL) is able to successfully learn the optimal actions in a simulated environment. However, the applicability of RL in real scenarios remains limited due to the high exploration effort. In this work, we propose a realistic simulation environment in which multiple models are built for the dynamics of the ball and the kinematics of the robot. Instead of training an end-to-end RL model, a novel policy gradient approach with TD3 backbone is proposed to learn the racket strokes based on the predicted state of the ball at the hitting time. In the experiments, we show that the proposed approach significantly outperforms the existing RL methods in simulation. Furthermore, to cross the domain from simulation to reality, we adopt an efficient retraining method and test it in three real scenarios. The resulting success rate is 98% and the distance error is around 24.9 cm. The total training time is about 1.5 hours.

Keywords: Table tennis robot, Stroke learning, Reinforcement learning, Sim2Real

Disclaimer: I was not part of this research project.
This video contains my commentary on this work.

TWO MINUTE PAPERS

MAN VS. MACHINE

- I did a research project about the growing Artificial Intelligence of a machine learning how to improve at Table Tennis.

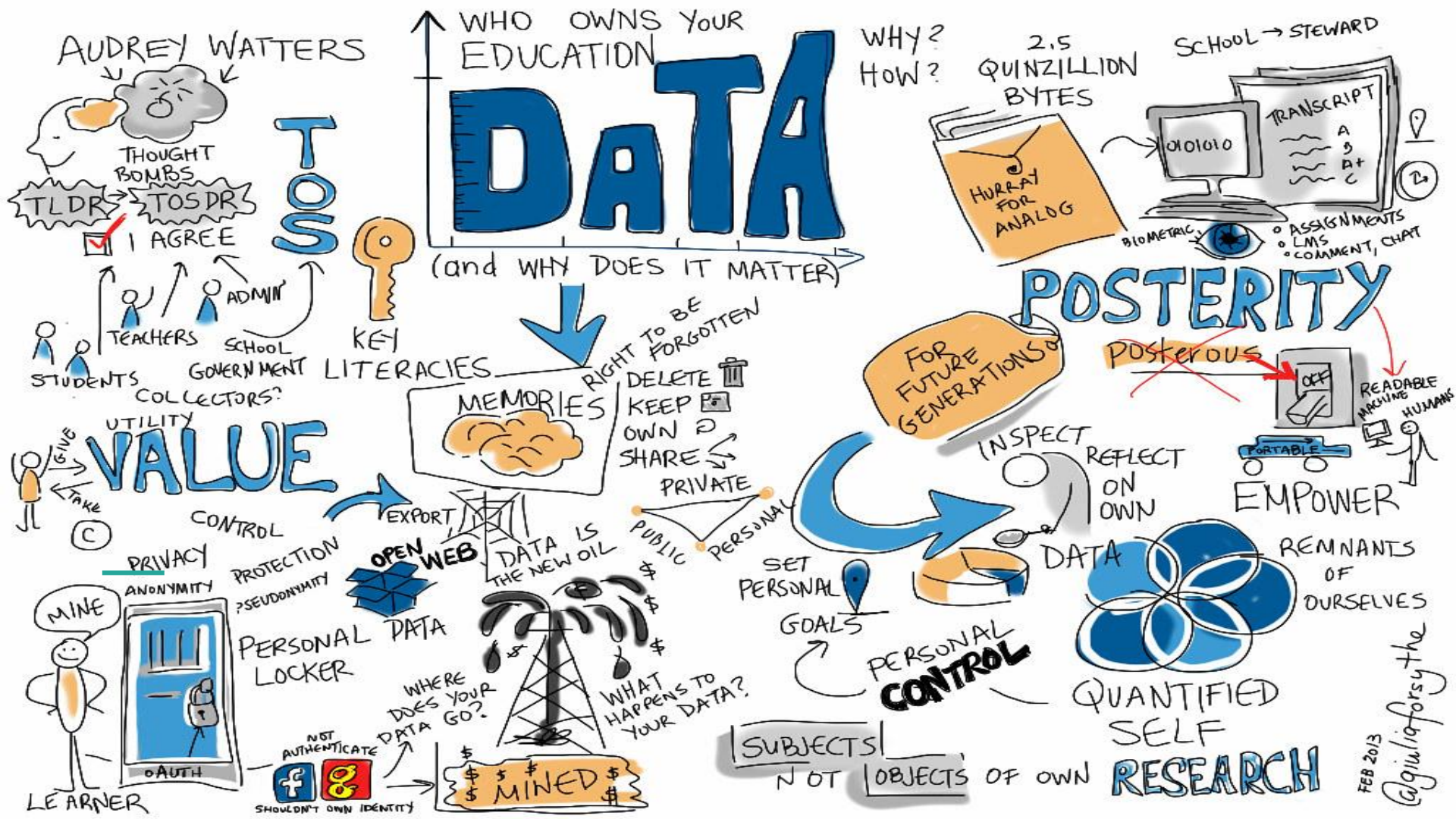
Manual adjustment of angle

Giveaway 10 balls

MORE VARIATIONS

=

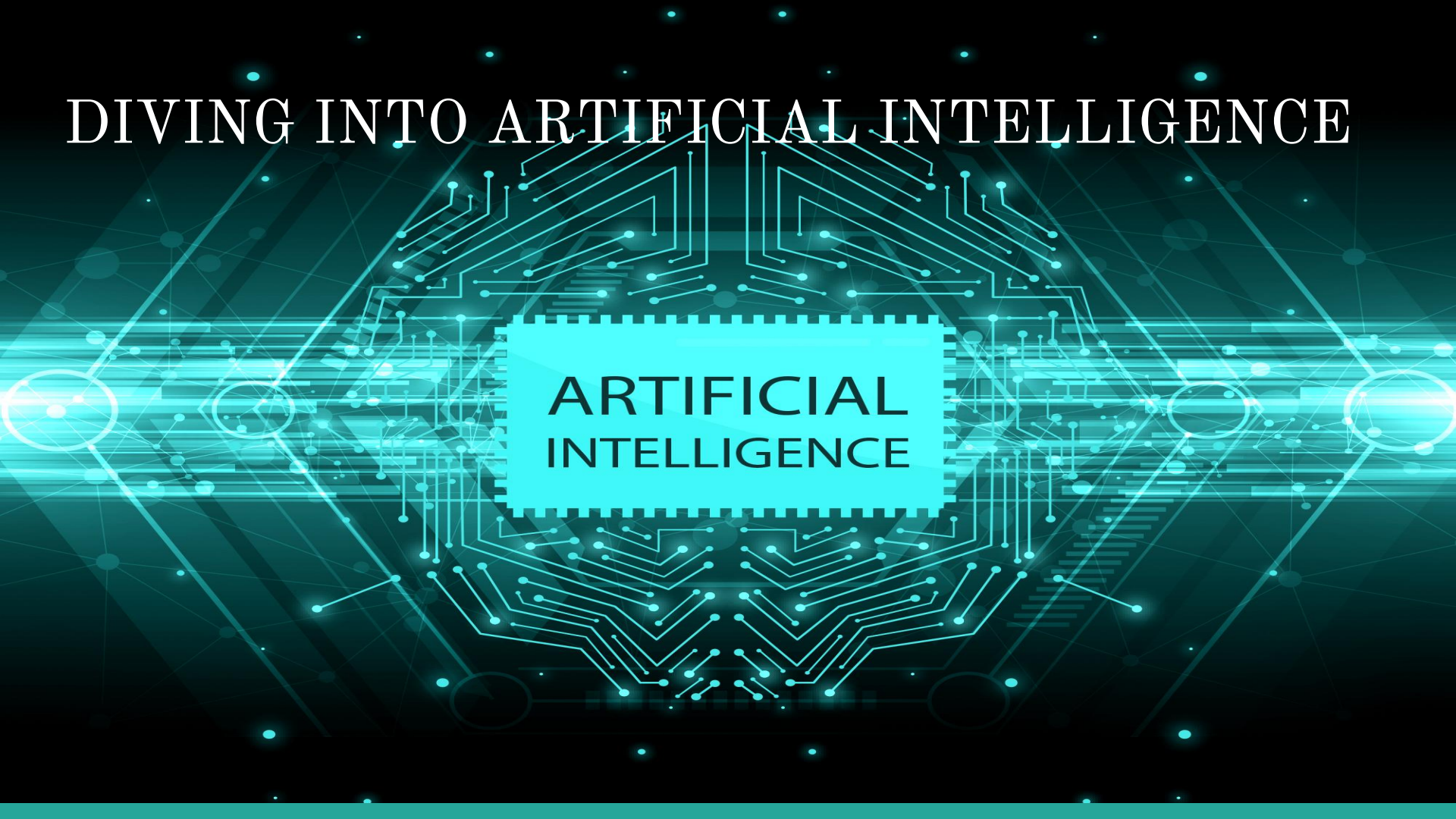
MORE DATA


AUDREY WATTERS
WHO OWNS YOUR EDUCATION
DATA
(and WHY DOES IT MATTER)
WHY?
HOW?
2.5 QUINZILLION BYTES
HURRAY FOR ANALOG
SCHOOL → STEWARD
TRANSCRIPT
0101010
A
B
B+
C
BIOMETRIC
ASSIGNMENTS
LMS
COMMENT, CHAT
THOUGHT BOMBS
TL DR
TOS DR
I AGREE
TOS
KEY
TEACHERS
ADMIN
SCHOOL GOVERNMENT
STUDENTS
COLLECTORS?
LITERACIES
MEMORIES
RIGHT TO BE FORGOTTEN
DELETE
KEEP
OWN
SHARE
PRIVATE
PUBLIC
PERSONAL
POSTERITY
FOR FUTURE GENERATIONS
POSTEROUS
OFF
READABLE
MACHINE
HUMANS
PORTABLE
EMPOWER
UTILITY
VALUE
GIVE
TAKE
CONTROL
EXPORT
OPEN WEB
DATA IS THE NEW OIL
INSPECT
REFLECT ON OWN DATA
SET PERSONAL GOALS
REMNANTS OF OURSELVES
PRIVACY
ANONYMITY
PROTECTION
PSEUDONYMITY
MINE
PERSONAL LOCKER
OAUTH
LEARNER
WHERE DOES YOUR DATA GO?
WHAT HAPPENS TO YOUR DATA?
NOT AUTHENTICATE
SHOULDN'T OWN IDENTITY
MINED
PERSONAL CONTROL
QUANTIFIED SELF RESEARCH
SUBJECTS NOT OBJECTS OF OWN
FEB 2013
@giuliaforsythe

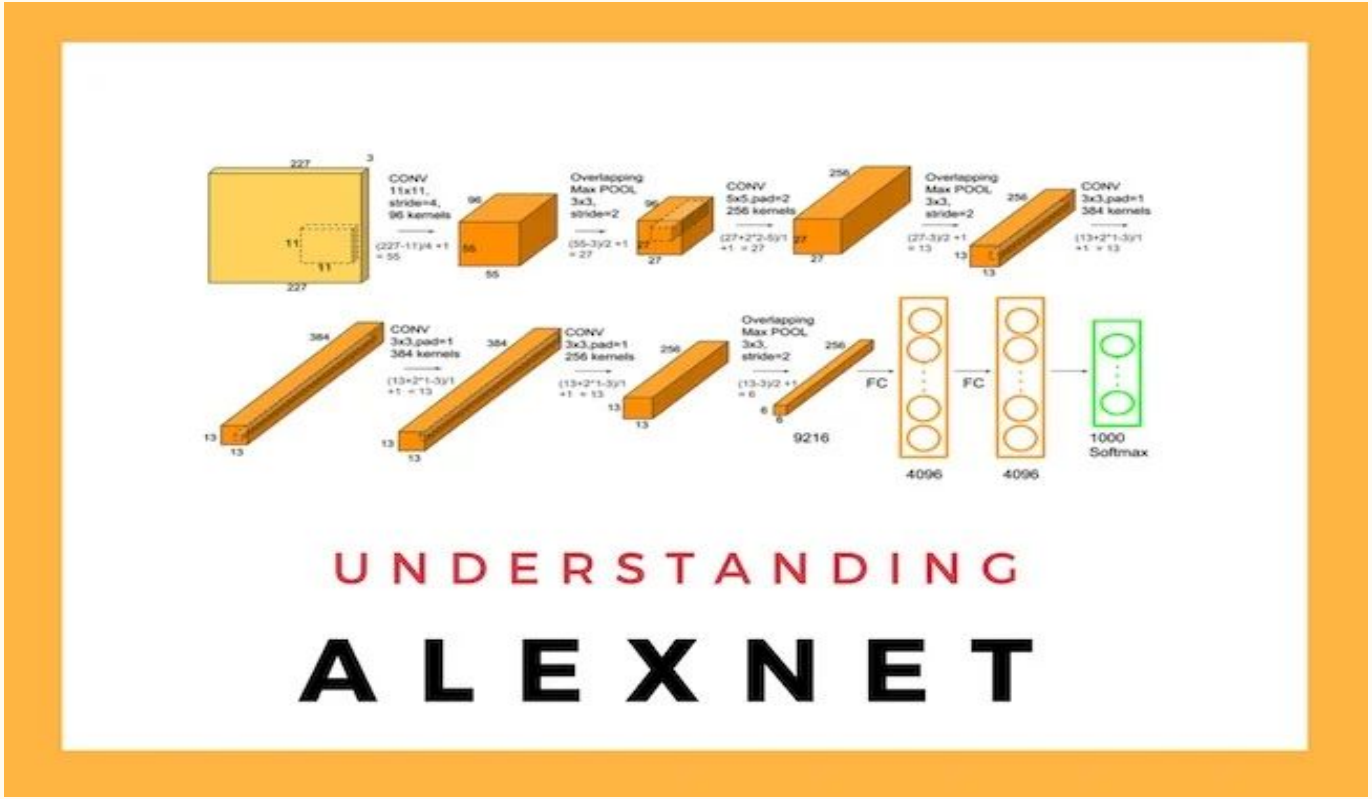
WITH MORE DATA ONE HAS BETTER POSSIBILITIES TO SOLVE PROBLEMS.

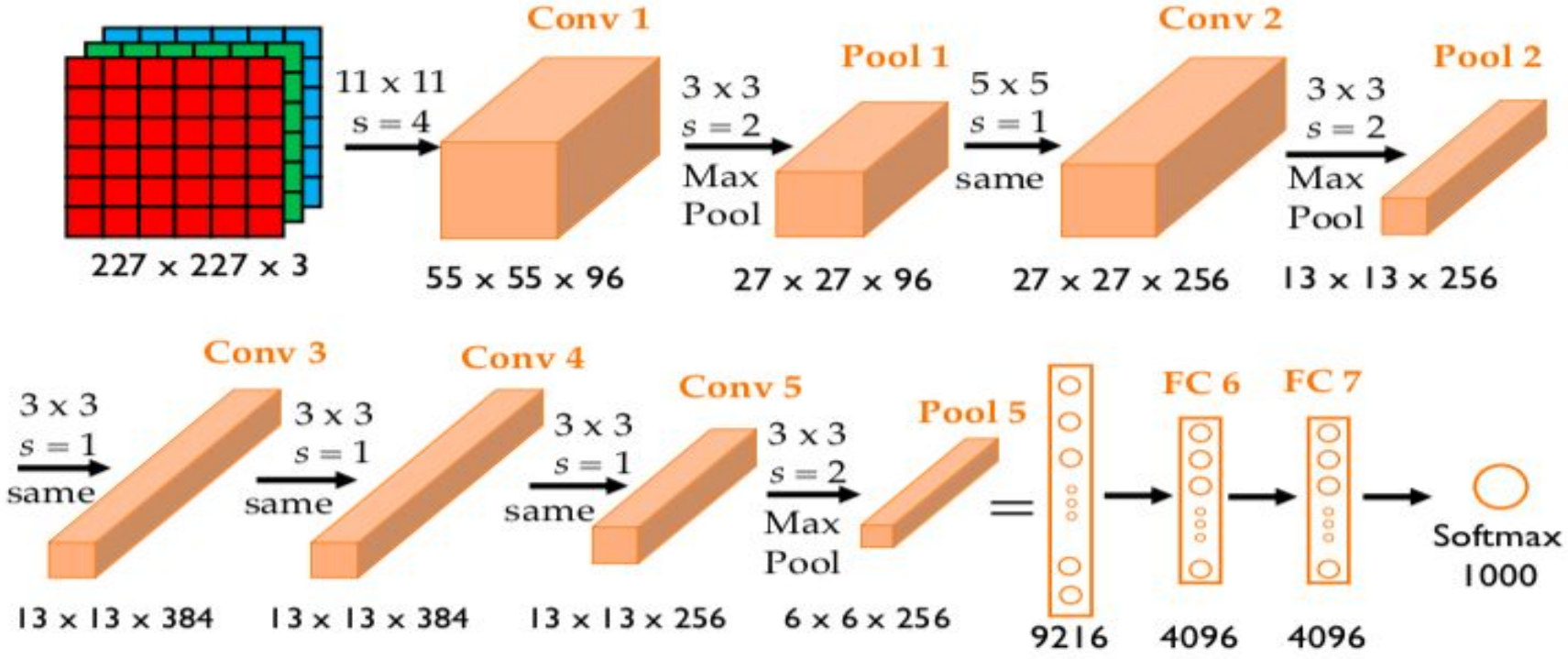
BIG IDEA

DIVING INTO ARTIFICIAL INTELLIGENCE



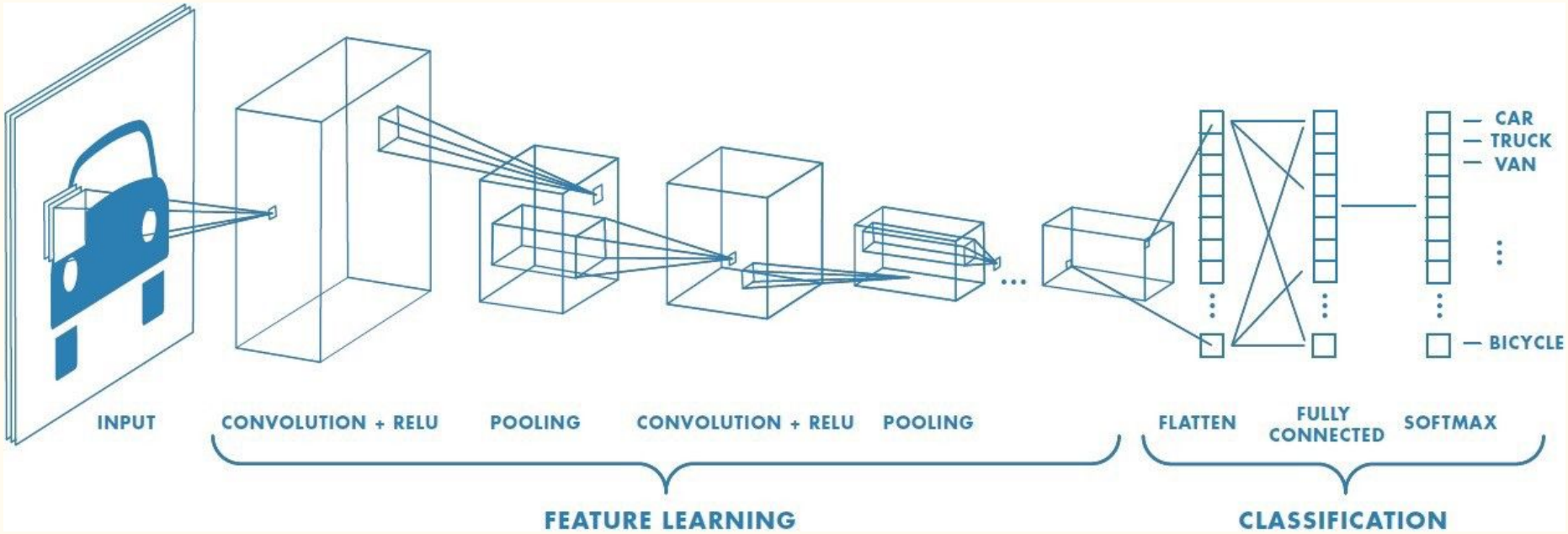
ALEXNET


227
3
CONV
11x11,
stride=4,
96 kernels
11
11
227
96
55
55
Overlapping
Max POOL
3x3,
stride=2
96
27
27
CONV
5x5,pad=2
256 kernels
256
27
27
Overlapping
Max POOL
3x3,
stride=2
256
13
13
CONV
3x3,pad=1
384 kernels
384
13
13
CONV
3x3,pad=1
384 kernels
384
13
13
CONV
3x3,pad=1
256 kernels
256
13
13
Overlapping
Max POOL
3x3,
stride=2
256
6
6
9216
FC
4096
FC
4096
1000
Softmax
UNDERSTANDING
ALEXNET



ALEXNET CONTINUED

CONVOLUTIONAL NEURAL NETWORKS



INPUT TO OUTPUT

CONVOLUTIONAL NEURAL NETWORK EXPLAINED

- Convolutional Neural Networks also known as CNN or ConvNet is also in the class category of artificial neural network (ANN). These things are used to analyze the visual imagery of an object. Convolutional Neural Network are also a more specialized type of artificial neural network, and they use convolution, which is a mathematical operation, in the place of a general matrix multiplication in one of the layers at the very least. This is used because they are designed specifically to process all the pixel data and is used in the image recognition/processing.

ARTIFICIAL INTELLIGENCE

- AI can be used to help the future in solving real world problems to help save lives in school shootings or terrorist attacks to prevent these attrocities from every happening.

SAMSUNG NEXT

How

AI is Changing The World

STEP INTO A NEW DOORWAY IN THE FUTURE

- The way Artificial Intelligence has endless possibilities to helping people, businesses, and virtually anything. This is the future and the faster everyone takes the time to learn these priceless skills the better of they will be at changing the world in these rapidly changing times. Knowing these useful skills will be able to put oneself ahead in the workforce.

CONCLUSION

WHAT'S NEXT... THE REST IS UP TO YOU

- Many companies are now using AI to integrate with their companies by using data to run more efficiently and to beat the competition.